ACCELERATED ACTION DESIGN FOR THE ORIGINAL LANDFILL ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

REGULATORY REVIEW CONSTRUCTION QUALITY ASSURANCE/ QUALITY CONTROL PLAN

Prepared for:
Kaiser-Hill Company, L.L.C.
Golden, Colorado

Prepared by:
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Englewood, Colorado

Project No. 57378.6030

March 2005

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LIST OF ACRONYMS AND ABBREVIATIONS

CDPHE	Colorado Department of Public Health and Environment
Contractor	Kaiser-Hill Company, L.L.C.
CQA	construction quality assurance
CQAE	Construction Quality Assurance Engineer
CSM	Construction Site Manager
DM	Design Manager
DOE	Department of Energy
Earth Tech	Earth Tech, Inc.
ECR	Engineering Change Request
EPA	Environmental Protection Agency
ER	Engineer's Representative
Kaiser-Hill	Kaiser-Hill Company L.L.C.
OLF	Original Landfill
OLF Cover	soil cover and buttress fill at the OLF
QA	quality assurance
QC	quality control
QCSM	Quality Control Site Manager
RFETS	Rocky Flats Environmental Technology Site
RFI	Request for Information/Clarification
RM	Responsible Manager
SQAM	Site Quality Assurance Manager
Subcontractor	construction subcontractor

1.0 PROJECT DESCRIPTION

The Original Landfill (OLF) is a 20-acre area where construction debris and general facility waste were placed from 1950 to 1968. The OLF is located on the south-facing slope just south of the Industrial Area pediment and borders on the northern side of Woman Creek.

The primary objective of the project is to reconfigure the landfill to improve stability, cover the waste with a minimum of 2 feet of soil, and provide surface water control. To achieve this objective, the project will include the following construction activities: regrade the existing slopes; add fill soil to achieve a consistent grade; cover the waste area with 2 feet of loose, un-compacted soil; and construct a soil buttress at the toe of the landfill. Surface water controls will include diversion berms and perimeter channels. Erosion control will include seeding and erosion mats.

This Construction Quality Assurance (QA)/Quality Control (QC) Plan has been developed to reflect the level of complexity of the project.

2.0 PURPOSE AND SCOPE

QA/QC for construction of the soil cover and buttress fill at the OLF (OLF Cover) will be conducted in accordance with this Construction QA/QC Plan. This Construction QA/QC Plan has been prepared for the Contractor (Kaiser-Hill Company, L.L.C. [Kaiser-Hill]) in conjunction with the design of the OLF Cover and will be implemented in its entirety to ensure the following:

- All Rocky Flats Environmental Technology Site (RFETS) project activities are performed in a manner consistent with the intent of all approved Design Drawings and Specifications.
- All performance criteria are achieved.
- The specified quality of work is maintained.

This Construction QA/QC Plan is a site-specific document that addresses the organization, authority, responsibilities, specific QA/QC requirements of project-specific tasks, and QA/QC documentation and submittals. This document includes considerations specific to the requirements of the construction of the OLF Cover.

DEFINITIONS OF QUALITY CONTROL AND QUALITY ASSURANCE

Quality Control is the overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that the process, item, or standard meets the established requirements.

Quality Assurance is the system that provides oversight and evaluation of the QC process and overall quality goals to ensure that QC is working effectively and that the project goals are being met.

3.0 QUALITY ASSURANCE/QUALITY CONTROL ORGANIZATION

3.1 PROJECT ORGANIZATION

It is anticipated that the following personnel will serve in specific QA/QC roles for the construction of the OLF Cover:

1. Mike Keating (Kaiser-Hill), Responsible Manager (RM)
2. Randy Thompson (Earth Tech, Inc. [Earth Tech]), Design Manager (DM)
3. Steve McQueary (Envirocon), Construction Site Manager (CSM)
4. John Rahe (TetraTech), Construction Quality Assurance (CQA) Engineer (CQAE)
5. Josh Valentine and Marshall Massaro (TetraTech), Site QA Managers (SQAMs)
6. To be determined (Envirocon), Quality Control Site Manager (QCSM)
7. To be determined, Quality Control Testing Subcontractor
8. Ryan Archibald and Scott Powell (Earth Tech), Engineer's Representatives (ERs)

3.2 ROLES AND RESPONSIBILITIES

The Kaiser-Hill **Responsible Manager** has responsibility for coordination of work performed at RFETS by the construction subcontractor (Subcontractor). He has overall responsibility for verifying that all project participants safely and properly implement their duties as related to the construction of the OLF Cover. Changes to the project scope or the approach to the implementation of the design brought on by differing site conditions or refinements to the task approach will be approved through the Kaiser-Hill RM. The Kaiser-Hill RM will be assisted by the DM and in the field by the ER.

The **Design Manager** will be responsible for providing the Contractor with a complete design package that includes design drawings, specifications, calculations, and a Construction QA/QC Plan. The design package will be stamped by a Professional Engineer registered in the State of Colorado. The DM will also be responsible for reviewing and approving all Requests for Information/Clarification (RFIs), submittals, and change orders.

The **Construction Site Manager** will be responsible for managing all construction activities, equipment, construction quality, safety, staffing, and daily briefings.

The **Construction Quality Assurance Engineer** will be responsible for certifying that the construction has been completed in accordance with the Environmental Protection Agency

(EPA)/Colorado Public Health and Environment (CDPHE)-approved plans, Design Drawings, Specifications, and changes. The CQAE will be a Professional Engineer registered in the State of Colorado who has provided engineering oversight for similar projects. The CQAE represents the organization responsible for QA; therefore, reference to the CQAE also refers to his/her company or designee. The designee for the OLF Cover installation will be the CQAE; any reference to the SQAM in this Construction QA Plan also refers to the CQAE. The CQAE is responsible for the implementation of and compliance with the CQA program for the construction scope of work. The CQAE will be on-site when appropriate. It is also the CQAE's responsibility to approve submittals and submit them to the Design RM for final approval. QA personnel are responsible for monitoring QC activities to ensure that the work complies with the contract requirements.

The **Site Quality Assurance Manager** is responsible for on-site project QA on a daily basis and for communication with the Design Team (Kaiser-Hill/Earth Tech). This mainly entails the responsibility to monitor, oversee, and direct the daily QA activity. The SQAM will complete a Daily QA Report and review the Daily QC Report. The SQAM will be present full-time for the duration of the project. The SQAM will support the CQAE in implementing the QA program. QA personnel are responsible for monitoring QC activities to ensure that the work complies with the contract requirements.

The **Quality Control Site Manager** will verify that day-to-day tasks are performed according to the approved project specifications and procedures and will report directly to the RM, CSM and the CQAE. The QCSM will be on-site full-time for the duration of the project. The QCSM shall have provided QA or QC oversight for similar projects. The QCSM's daily activities will include accumulation of data for and preparation of the Daily QC Report, material testing, and coordination and control of project-specific quality records. The QCSM will also implement QC and take the lead role in promoting and enforcing QC for all project subcontractors as well as coordinating all project inspections in accordance with criteria established by the overall construction team. The QC process will be the complete responsibility of the Contractor and its Subcontractor.

The **Engineer's Representatives** will be available to the project to clarify and resolve design issues as they arise during construction activities. It is important to have timely resolution of every issue to eliminate delays.

4.0 PROJECT MEETINGS

Periodic meetings will be held throughout the construction project. These meetings are intended to maintain communication among the Contractor, Subcontractor, Design Engineer, CQAE, QCSM, Department of Energy (DOE), EPA, CDPHE, and their representatives. These meetings will help maintain familiarity with construction procedures and activities, quality issues, health and safety issues, and field changes, if any.

The schedule, agenda, and attendees of these meetings are discussed in the following subsections.

4.1 PRE-CONSTRUCTION MEETING

A pre-construction meeting shall be held before the start of construction activities. At a minimum, the meeting will be attended by the DOE, the QCSM, who is in charge of QC activities; the CQAE, who is charge of QA activities; the Kaiser-Hill Construction Manager; the CSM; the DM; and representatives from the CDPHE and EPA. The meeting shall include the following:

- Review the project history, design and project organization;
- Discuss project safety, personal protective equipment, monitoring, hazards, heavy equipment, trucking, etc.;
- Discuss the Radiological Work Permit, including personal protective equipment, surveys, and controls;
- Discuss the CQA and construction QC documents, procedures, and communications;
- Project Schedule;
- Regulator oversight;
- Establish procedures by which the Subcontractor assists the QA/QC staff in obtaining samples; and
- Review the protocol(s) for handling construction deficiencies, repairs, and retesting outlined in the following section.

4.2 DAILY PRE-EVOLUTION MEETING

The construction project personnel will meet every day prior to starting work to discuss work assignments, safety, construction activities, work approaches, and QC issues. Attendees will sign the roster for the meeting.

4.3 WEEKLY PROGRESS MEETINGS

Weekly progress meetings will be held to:

- Review and discuss the previous week's activities and progress,
- Discuss current and future work,
- Discuss any current or potential construction problems,
- Discuss outstanding action items and their resolutions, and
- Discuss new action items.

The Kaiser-Hill RM will schedule and conduct the weekly progress meetings and will transmit the meeting minutes to all parties attending the meeting. Other individuals may be requested to attend the weekly meetings depending upon recent or future work activities. The SQAM will attend the meetings and designated representatives from the CDPHE and EPA shall be invited by the Kaiser-Hill RM to attend all weekly meetings so that they may discuss and evaluate progress.

4.4 WEEKLY CONSTRUCTION MEETINGS

Weekly construction meetings, similar to the weekly progress meetings but with construction personnel, will be held to:

- Review and discuss the previous week's activities and progress,
- Discuss current and future work,
- Discuss any current or potential construction problems,
- Discuss outstanding action items and their resolutions, and
- Discuss new action items.

These meetings are intended to discuss detailed construction issues with the construction management team. The SQAM will attend these meetings or assign a representative to attend in his/her absence. The Kaiser-Hill RM will schedule and conduct the weekly progress meetings and will transmit the meeting minutes to all parties attending the meeting.

4.5 PROBLEM OR WORK DEFICIENCY MEETINGS

Special meetings may be held when a problem or deficiency occurs or is identified. Special work deficiency meetings will be attended by the RM, QCSM, Design Manager, CQAE, SQAM, relevant subcontractors, and/or other involved parties, as necessary. The purpose of these meetings is to identify problems or deficiencies in the construction work, review alternative solutions, and select and implement corrective measures to resolve the problems or deficiencies.

5.0 COMMUNICATION

5.1 CHANGED CONDITIONS/CHANGE NOTICES

A key element of the design and construction process is addressing changes in project scope, changes in site conditions, and design changes to improve the quality of the finished product. These project changes will be managed by the RFI or Engineering Change Request (ECR) process. The objective of the project is to reconfigure the existing landfill into a more stable configuration with a minimum of 2 feet of soil cover. The Kaiser-Hill Construction Manager/RM, who is a licensed Professional Civil Engineer in the State of Colorado, will determine if the changes are minor (i.e., have no impact on stability and/or soil cover). Changes that are determined not to be minor will be addressed using the consultative process.

5.2 REQUEST FOR INFORMATION

The Contractor/Subcontractor will describe the issue and potential solutions on the RFI or ECR form and forward it to the DM, the Engineer of Record or designee for review. The DM or designee will concur with the change or recommend an alternative change. All RFIs will be tracked. A copy of the approved RFI form will be forwarded to the CQAE. Minor design changes will be documented and approved by the Kaiser-Hill Construction Manager/RM.

5.3 ENGINEERING CHANGE REQUEST

The Contractor/Subcontractor will describe the issue and recommended an engineering change on the ECR form and forward it to the DM, the Engineer of Record or designee for review. The DM or designee will concur with the engineering change or recommend an alternative change. All ECRs will be tracked. A copy of the approved ECR form (and drawings) will be forwarded to the CQAE. Minor design modifications will be documented and approved by the Kaiser-Hill Construction Manager/RM.

6.0 DOCUMENTATION

6.1 QA/QC DOCUMENTATION

Final acceptance of the OLF Cover will be achieved through adequate documentation of the construction and QA/QC activities. Attachment 1 provides sample project forms to be used throughout construction of the OLF Cover and lists the party responsible for the completion of each form. Final approval of all project forms will come from the CQAE and the Kaiser-Hill RM or their designee(s). All project forms may be modified to suit construction activities as long as the modifications are approved by the CQAE and the Kaiser-Hill RM. The project forms are:

- Daily Quality Control Report
- Daily Quality Assurance Report
- Field Nuclear Density Test Log
- Material Delivery/Inventory Checklist
- Submittal Register
- Transmittal Form

Project forms are not limited to this list and may be added as needed during construction or as required by the CQAE. Completed forms will be included in the Construction Completion Report described in Section 8.3.

6.2 DOCUMENTATION PROCEDURES

All project forms will be completed in blue or black ink in a legible manner. Errors made in any handwritten form will be crossed out with a single line and the correct information entered. The change will be initialed and dated by the individual making the correction.

When a project form has been completed, it will be submitted to the SQAM for review and approval. After approval by the SQAM, the forms will be submitted to the Kaiser-Hill RM.

6.3 RECORD KEEPING

Original project records will be maintained on-site by the Subcontractor. Copies of project records generated on the site during construction will be placed in a file cabinet under the control of the QCSM and SQAM. Examples of on-site project records include daily reports, testing logs,

and load tickets. Following construction, relevant file copies of all site records will be kept by the Subcontractor, the CQAE, and the Contractor.

6.4 NONCONFORMING CONDITIONS

Nonconforming conditions will first be noted in the QCSM's or SQAM's daily report. The reports will have action item checklists that will be carried over to following reports until the nonconformance is remedied. If the issue cannot be addressed by the QCSM or the SQAM, the nonconforming conditions may be handled through the RFI process. In any case, discussion of nonconforming conditions will take place during weekly construction meetings.

7.0 QUALITY ASSURANCE/QUALITY CONTROL PROCESS

7.1 CONSTRUCTION QUALITY CONTROL

The QC program will ensure that the construction of the OLF Cover is conducted in accordance with the Design Drawings and Specifications. The QCSM will be responsible for implementing the requirements set forth in the Design Drawings and Specifications. QC activities are outlined in the Specifications and summarized in Table 7.1.

All deficiencies will be reported to the SQAM for resolution. The CQAE or authorized representatives will be responsible for verifying and documenting adherence to the requirements set forth in the Specifications. The Contractor will obtain the services of an independent QC laboratory/firm (when this function is not delegated to the supplier/installer in the Specifications) to ensure QC monitoring/testing of all design components. All QC laboratories/firms will be approved by the Contractor. The latest version of all American Society for Testing and Materials testing standards shall be utilized.

In general, QC test locations will be chosen either randomly or based on identified suspect areas. The final QC tests will be performed on the remaining fractions at the required frequency interval given in Table 7.1. Material quantity estimates are given in Table 7.2.

7.2 QUALITY ASSURANCE

The CQAE will oversee and audit the QC testing equipment, procedures, and results throughout the project to ensure that proper QC testing equipment and methods are used and that accurate QC test results are obtained. The minimum QC testing frequencies are presented in Table 7.1. The CQAE will verify a minimum 5 percent of the field QC test results by performing QA tests on the same materials. If both the QA and the QC test results on a given material meet the Specification requirements, no further action is required. If one organization's test passes and another's fails, the QC test result will be the official test result. However, the CQAE will have the authority, based on his/her judgment, to overrule any QC test result and may require additional tests, repairs, or reworking of a given area/material based solely on the CQAE's test results and/or observations.

The CQAE or his/her representative will contract with an independent CQA laboratory(s) to perform the conformance testing. The CQAE will review all conformance test results for compliance with the Specifications. All non-conforming test results will be reported to the QCSM, Earth Tech, and the Contractor. The SQAM will perform continuous QA oversight during construction operations and report to the CQAE.

In addition to the QA activities described above and elsewhere in this QA/QC Plan, the SQAM will perform the following tasks:

- Observe all construction activities to ensure that the Subcontractor is utilizing the construction materials and procedures required by the Project Plans, Specifications, and Design Drawings;
- Review all submittals for conformance with the Project Plans, Specifications, and Design Drawings;
- Review the Daily QA Report prepared by the SQAM;
- Review all conformance test results for conformance with the Project Plans, Specifications, and Design Drawings;
- Participate in delineating failing or otherwise unacceptable areas;
- Participate in problem or conflict identification, resolution, and documentation; and
- Participate in all construction meetings.

8.0 REPORTS

8.1 WEEKLY QA REPORT

Following receipt of the Weekly QC Report, the SQAM will prepare a Weekly QA Report that summarizes all Subcontractor QC and QA activities and CQA organization activities. The SQAM will transmit the Weekly QA Report to the CQAE and the Kaiser-Hill RM. Typical types of formal submittals include test data, drawings, instructions, schedules, statements, reports, and certificates. All required submittals must be provided in time to allow for the review, approval, procurements, delivery, and QC preparatory phase of all items before they are needed for construction. As described in Specification Section 1305, Eng. Form 1288–Submittal Register or a similar form will be used for submittal control and scheduling. Eng. Form 4025–Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance or a similar form will be used for transmitting submittals.

8.2 CERTIFICATION REPORT

A Certification Report will be prepared, certified by the CQAE, and submitted to Kaiser-Hill for approval. After approval by Kaiser-Hill, the report will be distributed to the EPA, CDPHE, and the DOE following construction of the OLF Cover.

8.3 CONSTRUCTION COMPLETION REPORT

The Construction Completion Report will, at a minimum, include the following elements:

- A detailed chronology of the construction of the OLF regrade surface, buttress fill, and soil cover;
- A detailed chronology of the construction of the surface water control structures;
- A description of and rationale for any modifications to the Design Drawings and Specifications;
- A discussion of problems encountered and how they were addressed;
- Copies of all QA/QC field and laboratory soil test results;

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- Locations of all field test and samples through global positioning system surveying, shown on appropriate drawings;
- Quantities of all material used for the OLF Cover;
- Copies of key inspection, testing, and other documents, included as appendices;
- As-built drawings and photographs; and
- A summary statement, signed and sealed by the CQAE, that the project was completed in accordance with the CDPHE-approved Plans, Drawings, and Specifications.

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TABLES

TABLE 7.1

QA/QC SUMMARY
REGULATORY REVIEW DESIGN - ORIGINAL LANDFILL DESIGN, RFETS, GOLDEN, COLORADO

Quality Control Item	Specification Section	QA/QC Item	Method	Requirements	QC Action	QA Action
General Project	01310	Submittal	QA/QC Personnel Requirements	Submit to EPA/CDPHE 10 days prior to construction, including alternates.	NA	NA
		RFI Log	Documentation	Submit RFI log weekly to EPA/CDPHE or whenever a change is made.	Review	Review and approve
		Daily Reports	Documentation	QA Daily and QC Daily.	Submit QC Dailies to SQAM for Review	Submit QA Report to CTR
		Clearing and Grubbing	Visual Inspection	Ensure the vegetation is removed and relocated and the area is scarified to 6 inches.	Continuous	Continuous
Regrade and Cover Material (RFA)	02221	Submittal	Proposed Equipment List	Submit prior to use.	Review	Review and approve
		Submittal	Geotechnical Test Results	Submit prior to use.	Review	Review and approve
		Submittal	Certified Waybills	Submit prior to use.	Review	Review and approve
		Field density	Method Specification	See Specification 02221.	Continuous	Oversight of QC
		Atterberg limits	ASTM D 4318	Consistent with initial borrow area sampling as determined by the CQAE.	1/6,500 cy	1 per 20 QC samples (minimum of 1)
		Sieve analysis (with USCS classification)	ASTM D 422 and ASTM D 5519	Consistent with initial borrow area sampling as determined by the CQAE.	1/6,500 cy	
		Placement Documentation	Visual Inspection	In accordance with Specification Section 02221.	Continuous	Oversight of QC
Buttress Fill Material	02221	Submittal	Proposed Equipment List	Submit prior to use.	Review	Review and approve
		Submittal	Geotechnical Test Results	Submit prior to use.	Review	Review and approve
		Submittal	Certified Waybills	Submit prior to use.	Review	Review and approve
		Field density	ASTM D 2922	95% of maximum dry density +/- 2 percent optimum moisture content	1/5,000 ft2/lift	1 per 20 QC samples (minimum of 1)
		Field Density Calibration	Standard Counts	Conduct daily standard counts per Manufacturer's representative.	Daily when device is used	Oversight of QC
		Field Density Verification	ASTM D 1556, ASTM D 2167	Verify ASTM D 2922 results.	1/20 field density	Oversight of QC
		Field Moisture Verification	ASTM D 2216	Verify ASTM D 2922 moisture.	1/20 field density	Oversight of QC

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TABLE 7.1

QA/QC SUMMARY
REGULATORY REVIEW DESIGN - ORIGINAL LANDFILL DESIGN, RFETS, GOLDEN, COLORADO

Quality Control Item	Specification Section	QA/QC Item	Method	Requirements	QC Action	QA Action
Buttress Fill Material (cont.)	02221	Failed Density Test	ASTM D 2922	Two confirmatory tests adjacent to failed test. If either fails, area needs to be reworked.	As needed	Oversight of QC
		Laboratory compaction	ASTM D 698	Report	1/6,500 cy	1 per 20 QC samples (minimum of 1)
		Atterberg limits	ASTM D 4318	Consistent with initial borrow area sampling as determined by the CQAE.	1/6,500 cy	
		Sieve analysis (with USCS classification)	ASTM D 422	Consistent with initial borrow area sampling as determined by the CQAE.	1/6,500 cy	
		Placement Documentation	Visual Inspection	In accordance with Specification Section 02221.	Continuous	Continuous
Drain Rock	02222	Submittal	Proposed Equipment List	Submit prior to use.	Review	Review and approve
		Submittal	Geotechnical Test Results	Submit prior to use.	Review	Review and approve
		Submittal	Certified Waybills	Submit prior to use.	Review	Review and approve
		Field gradation	Visual Inspection	See Specification 02222-2.01	Daily inspections as material is delivered	Daily inspections as material is delivered
		Sieve analysis	ASTM C 136 or ASTM D 5519	See Specification 02222-2.01	1/6,500 cy	1 per 20 QC samples (minimum of 1)
		LA abrasion	ASTM C 131	≤ 10% loss for 100 revs or ≤ 40% loss for 500 revs	1/25,000 cy	1 per 20 QC samples (minimum of 1)
		Sodium sulfate soundness	ASTM C 88	≤ 10% loss		
		Absorption	ASTM C 127	2% or less		
		Placement Documentation	Visual Inspection	In accordance with Specification Section 02222.	Continuous	Oversight of QC
Riprap and Riprap Bedding	02245	Submittal	Proposed Equipment List	Submit prior to use.	Review	Review and approve
		Submittal	Geotechnical Test Results	Submit prior to use.	Review	Review and approve
		Submittal	Certified Waybills	Submit prior to use.	Review	Review and approve
		Field gradation	Visual Inspection	See Table A	1/Material type (i.e., 6-inch or 9-inch riprap, or bedding material)	1 per 20 QC samples (minimum of 1)
		Sieve analysis	ASTM C 136 or ASTM D 5519	See Table A	1/Material type (i.e., 6-inch or 9-inch riprap, or bedding material)	1 per 20 QC samples (minimum of 1)
		Placement Documentation	Visual Inspection	In accordance with Specification 02245.	Continuous	Oversight of QC

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TABLE 7.1

QA/QC SUMMARY
REGULATORY REVIEW DESIGN - ORIGINAL LANDFILL DESIGN, RFETS, GOLDEN, COLORADO

Quality Control Item	Specification Section	QA/QC Item	Method	Requirements	QC Action	QA Action
Seeding	02900	See requirements in Specification Section 02900.	See requirements in Specification Section 02900.	See requirements in Specification 02900.	See requirements in Specification Section 02900.	See requirements in Specification Section 02900.
As-Built Surveys	01310	See requirements in Specification Sections 01310 and 01720.	See requirements in Specification Sections 01310 and 01720.	Verify elevations required by design.	As required	As required, at the discretion of the CQAE.

Notes:

Test methods refer to American Society for Testing and Materials (ASTM) standard test methods.
* = Minimum of one test per backfill area.
≤= less than or equal
% = percent
+/- = plus or minus
CDPHE = Colorado Department of Public Health and Environment
CQAE = Construction Quality Assurance Engineer
CTR = Contractor's Technical Representative
cy = cubic yards (volume based on "in place" volume)
EPA = Environmental Protection Agency
ft2 = square foot
LA = Los Angeles
NA = not applicable
QA = quality assurance
QC = quality control
revs = revolutions
RFA = Rocky Flats Alluvium
RFI = Request for Information/Clarification
SQAM = Site Quality Assurance Manager
USCS = Unified Soil Classification System

TABLE 7.2

MATERIAL QUANTITIES[1]
ORIGINAL LANDFILL DESIGN, RFETS, GOLDEN, COLORADO

Material	Quantity	Unit
Regrade Material (RFA)[2]	45,000	bank cubic yards
Soil Cover Material (RFA)	39,000	bank cubic yards
Diversion Berm Soil	4,800	bank cubic yards
Butress Fill Material	52,000	bank cubic yards
Drain Rock	9,000	bank cubic yards
Erosion Matting (C125)	83,000	square yards
Erosion Matting (C350)	6,800	square yards
Erosion Matting (P550)	7,000	square yards
Georidge	840	linear feet
Geogrid	9,500	square yards
24-inch Boulders	88	total

Notes:

[1]Quantities are based on the Regulatory Review Design Drawings and will be modified upo completion of the design.

[2]Regrade material quantity represents volume to be imported from off-site borrow area.

RFA = Rocky Flats Alluvium

ATTACHMENT 1

SAMPLE PROJECT FORMS

QUALITY CONTROL REPORT

Client: *RFETS*

Project: OLF

Project #:

Contractor(s):

Contractor Super(s):

Date:

Contract #:

Weather:

Temperature **High:** **Low:**

Daily Notations:

QC Action Items:

ACTION	COMPLETED

QCSM Signature

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QUALITY ASSURANCE REPORT

Client: RFETS
Project: OLF
Project #:
Contractor(s):
Contractor Super(s):

Date:
Contract #:
Weather:
Temperature **High:** **Low:**

Daily Notations:

QA Action Items:

ACTION	COMPLETED

SQAM Signature

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Field Density Test Report (Nuclear Density Test)

Date:	**Project:** RFETS OLF
Daily Report No.:	**Project No.:**
Technician:	**Gauge Number:**

Test Number	Soil Type	Approximate Northing	Approximate Easting	Lift	Probe Depth (Inches)	Wet Density (Pcf)	Dry Density (Pcf)	Moisture (Pcf)	Moisture (%)	Opt. Moisture Req. (%)	Proctor (Pcf)	% Compaction

Project Requirements:
Min. % Compaction:
Max. % Compaction:

Passed:_____

MATERIAL DELIVERY/INVENTORY CHECKLIST

Project Name: Project Number: QCSM Name:

Material Type	Quantity	Vendor	Damage / Remarks

SUBMITTAL REGISTER

PROJECT _____
JOB NUMBER _____
LOCATION _____

PAGE _____
DATE _____

Section Description	Section No.	Para. No.	Component	Description of Item	Transmittal No.	Submittal Classification[1]	Submission Date	Approval Date	Remarks

[1] Submittals shall be classified as D (Designer of Record Approval), QA (CQAE Approval), or FIO (For Information Only).

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TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURERS CERTIFICATES OF COMPLIANCE	TRANSMITTAL NO.: DATE:
To:	From:
Specification Sec. No.	Project Title and Location:

Item No.	Description of Item Submitted	No. of Copies	Spec. Para. No.	Drawing Sheet No.	Variation

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict compliance with the contract drawings and specifications except as otherwise noted.

NAME AND SIGNATURE OF CONTRACTOR

NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE